Perkin-Elmer Corp. Expands

NORWALK, Conn.—Perkin-Elmer Corp. has started construction of a 54,000 square foot addition to its optional production shops, Richard S. Perkin, president, announced.

Scheduled for completion in September, the new two-story wing will increase the company's production facilities by 80%. It will also house research and administrative departments. Much of Perkin-Elmer's work centers around optics for earth satellite tracking cameras, missile tracking systems, special prisms and lenses for analytical instruments and high altitude aerial reconnaissance lenses.

Wall Street Journal - 5 June 1957

6-17-57

ENCL #2

Items

1-9 Windows: the design and fabrication of the windows for the "C" Configuration system proved to be costly and more sophisticated than anticipated. At the time the target cost was set the "C" system design had not been started. The need for surface flatness over a 13" aperture and a wedge to compensate for refractive index differences (because of window configuration required by aerodynamics) went beyond the original, intended scope.

Target price $181,456
Target cost $143,376

10-11, 256,300 Tracking Camera (Data Camera): this camera has proven to be an exceptionally useful tool for this Project. Its use as the reliable work horse with all configurations has proven the considerable design effort and close supervision that went into its manufacture.

Target price $463,118
Target cost $375,220

18-19 Image Evaluator: this device was designed and constructed to test and evaluate the reworked 24" f/6 lens and the new design 24" f/8 and 36" f/10. It provided data in the same form as would be measured from negatives taken with the lens under actual operating conditions. This led to a much closer evaluation of the usefulness of each reworked lens and new production units in terms of its end use. For example: the evaluator was able to establish that the 36" f/10, <u>in actual use</u> would yield (on the average) 40 1/mm on axis, which turned out to be the actual case.

Target price $19,726
Target cost $15,900

20,309 Services of Dr. J. G. Baker for the optical computations on the 24" f/6 reworks, 24" f/8 new design, 36" f/10 new design and the 180" f/13 system. Those who know Dr. Baker and are familiar with the lenses he designed for this project are aware of the unique designs which contributed, in large measure, to the success of this activity.

Target price $88,357
Target cost $69,814

21-25 36" f/10 lens: the success of these lenses in the "B" Configuration is well know. The maintenance of close tolerances and selective fitting provided the quality demonstrated.

Target price $90,948
Target cost $72,032

26-31, 266,268, 269,301-306 Drift Sight and Hand Control: originally intended only for the "C" Configuration the possibilities inherent in this device justified its universal use. Four functions were originally intended and designed into the unit produced: a) as a seeing device for the pilot b) as a navigational aid to establish ground speed and drift c) as the controller for the "C" Configuration plus switching means for the 'A' and 'B' Configurations, d) complete interchangeability for use with "C"

Items

Configuration (the most sophisticated system, using all the capabilities of the Drift Sight and Hand Control). Of these only items, (b), was replaced by later devices and navigational experience gained from operational use. One other restriction on its design was the requirement for complete independence from 400 cycle power, or any electrical power other than 28VDC. In its initial use certain problems were encountered in operation, as was to be expected. These problems were solved but at the expense of engineering time required on other equipment in production.

Target price	$530,998
Target cost	$419,562

32-34 Computer: As yet not completely field tested for its intended use with the "C" Configuration (as an adjunct to the Hand Control). It has been thoroughly lab tested. A unique mechanical storage unit, it was designed and manufactured long before (in retrospect) it was needed. Difficulties in establishing space availability in the cockpit required design modifications resulting in unanticipated costs. The cooperation received from the aircraft manufacturer was excellent but the pace of the delivery requirements did not always permit instantaneous transmittal of space allocation changes.

Target price	$64,478
Target cost	$51,087

35-37 24" f/6 lens rework: in an effort to reduce procurement delay,of lenses for the "A" Configuration, to a minimum the Project Plan called for reworking of existing 24" f/6 lens to yield higher performance. This objective was accomplished with a high degree of success but at considerable cost in manpower and dollars. The false start with B & L lenses before settling down to Pacific Optical lenses was an unanticipated cost. The B & L lenses were discarded because of their weight (due to the heavy brass lens cell) and lack of availability in sufficient quantities for the need of the program. The problems in establishing a successful rework of another manufacturer's design and construction were considerably greater than originally estimated. Estimating this type of work is exceptionally difficult, particularly when no lens or time was available for establishing the problem areas and method of attack on the problem.

Target price	$44,296
Target cost	$35,000

38-42 24" f/8, new lens: the first design, by Dr. J. G. Baker,started in production on the basis of partial tests of the first prototype. This was a calculated risk taken only for the sake of meeting the delivery schedule. Unfortunately a design modification was required, and resulted in a contract change by amendment. None the less time had been lost and additional efforts were made to regain some of this time.

Target price	$111,246
Target cost	$87,900

43-45 Mirrors: these were mirrors for the "B" Configuration and six sets of mirrors for the "C" Configuration. Since weight was one of the design criteria the original intent was to use quartz foam with a sheet quartz surface (for the mirror surface).

The supplier for the large pieces required provided them through an experimental laboratory setup which was dismantled just at the time the design had been completed and the sizes known accurately. This required going to a solid quartz material with the attendant need to find some means of reducing weight. This weight reduction was accomplished in a unique manner by Perkin-Elmer through adaptation of a honeycomb design routed in the back of the mirror. This additional design and manufacturing method was beyond the original intent at the time the cost estimate was made. Coupled with this was the fact that only the crudest knowledge existed of the requirements for mirrors for the "C" Configuration optical system at the time costs were estimated. As the "C" Configuration optics took firmer shape the difficulties in achieving the optical tolerances required increased. In particular the difficulties in manufacturing the scanning mirror (for "C" Configuration) exceeded the original estimate. Three such mirrors have suffered accidents during production, wiping out months of painstaking, polishing and figuring labor.

Redesign of the primary mirror and one of the plane mirrors (both part of the mirror set for "C" Configuration) were required by mechanical interferences within the aircraft. A request for contract amendment on this is forthcoming. Field tests on the first primary mirror indicated a need to redesign its mounting. A task which has already been accomplished.

Target price	$126,889
Target cost	$100,260

46-48
307 "C" Configuration Optics: one set of lenses has been delivered to date. The uniqueness of this sytem has been cause for engineering, design and testing beyond the original intention at the time of cost estimate preparation. In particular the requirements placed by the optical design on air spacing and concentricity to .0002" have made manufacturing a hand fitting process. Problems in working the calcite glass, called for by the lens designer, have called for special techniques; two such pieces have been lost by fracture due to thermal stresses during manufacturing. The need for four aspheric surfaces was an unexpected cost item. A redesign of the elbow mirror mounting was required to meet the rigid alignment tolerances revealed during assembly and field tests of the first system. The location and provision for a mount and space for the focal plane shutter led to machining and casting changes of the field lens group, mounting cell.

Target price	$132,557
Target cost	$104,739

51 Test Equipment: this item eventually covered test equipment for the Hand Control, Drift Sight, Computor, the ROLIT (Rotating Light Timer, for flight tests of shutter, IMC and aircraft stability), 100" and 300" Collimators. At the time this cost estimate was prepared, no true concept of the test gear complexity existed since the initial equipment design had barely started. The first estimate was rejected on the grounds that insufficient funds were available. [redacted] negotiate 25X1 this matter with George and Herb. In an effort to meet their obvious budgeting difficulties at this time and in order to initiate the necessary work (ROLIT and collimator design) the estimate was reduced in hopes that it would suffice for the job. If not, it was anticipated that renegotiation proceedings would recognize

the fact and act accordingly.

Target price $101,249
Target cost $85,995

257 Modify Drift Sight for Sextant: A total of 17 out of 21 Drift Sights have been modified to date to accept the sextant. This adaptation was initiated after half the Drift Sights had been shipped. It is a factory modification and requires return of the Drift Sight to Perkin-Elmer. The original intent of this item was to check out the modification with a sextant, in the lab. Field operations proved this to be unnecessary.

Target price $6,390
Target cost $5,049

308 Assembly Drift Sight and Sextant: this covered the first assembly only, as a trial installation to establish the modification required of the Drift Sight for production purposes.

Target Price $286
Target cost $226

317 Train Personnel: covered training Hycon Detachment personnel in Drift Sight, Hand Control and Tracking Camera maintenance.

Target Price $2,487
Target Cost $1,960

28A Repair of Hand Control 101: This was a repair made in accordance with instructions from Headquarters. A contemplated amendment #7 to SC 21-54 will cover other repair work in accordance with earlier correspondence and conversations on the subject.

Target price $2,731
Target cost $2,160

184 Administration of procurement of equipment from Hycon: by original contract negotiation this item represents a fee of 8% of Hycon's subcontract price to us for administrative services. Of this 8%, 5% is considered as profit and 3% as labor costs. The original intent of this work was increased considerably in scope with the passage of time. Among the chief factors responsible for this were:

a) Prolongation of the overall program from a contemplated one year activity to two and one half years (as of this writing).

b) The need to furnish unbudgeted engineering support to the Detachment teams. The original intent was that the Hycon, prime contract, furnished maintenance personnel would service and maintain the Drift Sight, Hand Control and Tracking Camera in the field. Unfortunately, this did not work out as smoothly as was thought. Through pressure from the Ranch (in the form of continual requests for Perkin-Elmer personnel) we finally were forced to assign a man full time to the field. His training started in May of 1956 and upon receipt of his clearance in September 1956 he started working full time at the Ranch.

In addition, it was necessary to supply engineers for field work who were

needed at Perkin-Elmer for work on equipment for this project. A few of the m[redacted] instances were [redacted] trips in 1956 on Tracking Camera work, [redacted] 25X1 trips to the [redacted] on Drift Sight work thro 25X1 out 1956. Their absence from the plant delayed production activities with consequent loss of time and money for other items produced under SC 21-54. The same has been true of the "C" Configuration, with [redacted] making numerous field trips in 25X1 em- ber, January and March of 1957. In almost every case these trips were of at least one week's duration with attendant cost for transportation and living facilities. Where possible these costs were charged to the individual contract items, otherwise the charges were to item 184 since they were supervisory in nature.

Target Price	(as of S.A.#6)	$330,548
Target Cost	(as of S.A.#6)	$124,000

TWM:hmm